

## REVIEW

## Behavioural surveillance: the value of national coordination

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Behavioural surveillance programmes have enabled the description of population patterns of risk behaviours for STI and HIV transmission and aid in the understanding of how epidemics of STI are generated. They have been instrumental in helping to refine public health interventions and inform the targeting of sexual health promotion and disease control strategies. The formalisation and coordination of behavioural surveillance in England and Wales could optimise our ability to measure the impact of interventions and health promotion strategies on behaviour. This will be particularly useful for monitoring the progress towards specific disease control targets set in the Department of Health's new Sexual Health and HIV Strategy.

**S**exually transmitted infections (STI) and HIV result in considerable morbidity and mortality with substantial social and economic cost.<sup>1</sup> They place considerable burden on health-care resources required for their treatment and prevention as well as long term management required for their sequelae including ectopic pregnancy, cervical cancer, and infertility. STIs are important in their own right but may also be markers for risk of HIV. Teenagers and young adults, women, and some ethnic minority groups are disproportionately affected.<sup>2–5</sup> Sexual behaviour remains the key determinant of STI transmission. Thus, the key indicators for understanding and monitoring transmission rates need to be appropriate for the population and risk group under consideration.

There is evidence of deterioration in sexual health in the United Kingdom. Surveillance data indicate large recent increases in the numbers and rates of bacterial and viral STIs in the United Kingdom. In 2001 there were 673 000 new episodes seen at genitourinary medicine (GUM) clinics in England.<sup>6</sup> New diagnoses of STI between 1996 and 2001 rose by 86% for gonorrhoea, 501% for infectious syphilis, and by 106% for genital chlamydia. The highest numbers of HIV diagnoses were seen in 2001 and there is evidence to suggest that HIV transmission is not slowing.<sup>7</sup> There have also been outbreaks of syphilis in homosexual men, many of whom have HIV.<sup>8–9</sup> These rises have been attributed to increasing high risk sexual behaviour, including unprotected sex and high rates of partner change particularly in young heterosexuals<sup>10–11</sup> and men who have sex with men (MSM).<sup>8–9–12</sup> Data from

the National Survey of Sexual Attitudes and Lifestyle (Natsal) confirm this.<sup>13</sup> Similar increases have been seen in western<sup>14–15</sup> and eastern Europe<sup>16–17</sup> and the United States.<sup>18–20</sup> The resurgence of acute STI, the emergence of STI outbreaks among MSM, and concomitant increases in the risk of HIV transmission are cause for concern.

HIV and STI surveillance data in the United Kingdom are useful for monitoring trends in diagnoses. However, they are relatively poor indicators of infection incidence and burden in the population as they are influenced by a number of factors including frequency of symptomatic disease, test sensitivity and uptake, health seeking behaviours, and referral patterns. These factors also limit their usefulness for measuring the success of prevention programmes. Several factors unrelated to prevention programmes can contribute to observed stabilisation or decrease in STI and HIV prevalence in a given setting. These can include mortality, saturation effects in subpopulations at higher risk, differential migration patterns, or sampling bias.

Although disease surveillance data suggest deterioration in sexual health in the United Kingdom since the mid-1990s, they do not provide information on the sexual behaviours or mixing patterns that may be underlying this trend. Public health surveillance of sexual behaviour is needed to measure risk behaviours that will both allow the monitoring of the effectiveness of prevention programmes and may provide early warning signs for the spread of HIV and STIs. This has been achieved in many other countries including some in Asia,<sup>21–23</sup> Africa,<sup>24</sup> Europe,<sup>25</sup> and the United States.<sup>26</sup> Trends over time are needed because while one-off studies can provide useful baseline information trends are necessary for interpretation. The outcome should be timely, relevant, and have high quality data, which can allow those in health promotion and disease prevention to respond effectively to observed changes.<sup>27</sup>

**WHAT IS BEHAVIOURAL SURVEILLANCE?**

Behavioural surveillance is the ongoing systematic collection, analysis, and interpretation of behavioural data relevant to understanding trends in the sexual transmission of infection.<sup>28</sup> This should be followed by timely dissemination of these data to those responsible for prevention and control. Knowledge of the size of the population groups at risk, and the nature and determinants of risk within those populations are necessary. Behavioural surveillance generally aims to monitor trends in two broad groups of indicators;

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firstly, those that allow the identification of population subgroups at increased risk—for example, age, sex, sexual orientation, and ethnicity. Secondly, those behaviours that are amenable to change—for example, number and type of sexual partnerships, condom use, unprotected anal intercourse. The validity and reliability of sensitive data on behaviour are critical as they are self reported and can't be directly measured.<sup>29</sup> The triangulation of a small set of core measures selected from surveillance data and other complementary sources can strengthen the interpretation of these data as the relation between sexual behaviour and STI transmission is complex.

Any attempt to establish behavioural surveillance in England and Wales should therefore seek to answer the following questions: which behaviours are important determinants of current STI and HIV transmission? How are these behaviours distributed and how can they be measured over time? What key behavioural data are not currently being collected? How best can these gaps be filled?

## HOW MAY IT BE ACHIEVED?

### General population surveys

Behavioural surveillance is generally conducted at two levels, among the general population and within targeted risk groups. General population surveys are useful in assessing overall trends and distribution of behaviours that may be associated with STI transmission. These provide the most robust estimates of prevalence of behaviours, as they largely avoid the biases inherent in most targeted population surveys. Although regular repeated surveys are needed to measure changes in behaviours over time their expense may make this difficult. Adding additional questions to existing population social surveys is a method that has been successfully deployed in other countries<sup>30</sup> as a cost effective way of getting population based estimates. This has been suggested for collecting sexual behaviour data in the United Kingdom.<sup>29</sup> A large number of surveys are currently carried out which could be used in this way.<sup>31–32</sup> This kind of survey makes it possible to access a general population sample, but does limit the number of questions that can be asked.

General population surveys are usually less suitable for obtaining detailed information on population subgroups at highest risk. These groups tend to be small, more clustered, and difficult to access and small subgroups of individuals with relatively rare risk behaviours may not be captured in sufficient numbers. Groups of particular interest for HIV and STI transmission include homosexual and bisexual men, injecting drug users, commercial sex workers, and ethnic minorities, particularly those from or who have contact with countries with a high HIV/STI prevalence. These problems can be overcome through adapting study designs to include over-sampling and focused enumeration.<sup>13</sup>

### Targeted population surveys

Targeted population surveys are also a useful adjunct to these general population surveys as they give greater detail on populations at highest risk. However, the difficulty in accessing these populations makes probability sampling costly. More cost effective sampling strategies are needed; these can include advertising, snowballing, recruiting from GUM clinics, and social and commercial venues. However, these strategies may result in a sample selection bias and decreased representativeness of results. Targeted behavioural surveillance can include serial cross sectional surveys, using the same sampling strategy and using core questions to ascertain the prevalence of risk behaviours.

The disadvantage of targeted population surveys is that they are likely to be unrepresentative, given the nature of the convenience sampling. Those accessed through this mixture of social venues can only be representative of those using these sites. In addition, even among venue attenders the behaviour

of study respondents may systematically differ from non-respondents. In order to overcome this problem, surveys from a range of settings are needed, in order to achieve a more representative sample. New and innovative ways of accessing these populations are needed—for example, accessing MSM through internet chatrooms.<sup>33–34</sup> Cross comparability of surveys done in different populations accessed through different means will allow an overview picture of the distribution of behavioural risk within the population under investigation. Questions that will allow the linking of the populations will enhance the interpretation of the individual surveys.<sup>35</sup>

## Behavioural surveillance in England and Wales: assessing the existing capacity

### Disease surveillance

Current surveillance systems collect limited data on the behavioural determinants of STI transmission. Where they exist they are often limited to facilitate ease of completion by busy clinical staff. Most systems rely on methods more focused on disease outcome, practicality, uniformity, and rapidity rather than on obtaining full demographic and behavioural details. Generally, the additional data collected are minimal (typically age, sex, sexual orientation) (table 1). These allow the grouping of diseases by risk factors, although clearly these are not behaviours amenable to change. Some enhanced surveillance systems have been developed that include more detailed behavioural data to allow the characterisation of those with diagnosed infections<sup>36–37</sup> (table 1). For example, the enhanced KC60 surveillance system will not only allow more risk factor information to be collected on an individual basis, but will also allow rates of co-infection and re-infection of STI to be examined and core groups to be more accurately described.<sup>3–38</sup>

There is comprehensive national surveillance of AIDS cases and diagnosed HIV infections.<sup>39–41</sup> This surveillance system has recently been enhanced, and now clinicians are also asked to report all newly diagnosed HIV infections. The new clinician HIV and AIDS report form collects more behavioural data at the time of first HIV diagnosis (table 1) and provides the most comprehensive picture of all surveillance systems.

The unlinked anonymous HIV seroprevalence surveys provide sentinel HIV prevalence data and have been ongoing since 1990.<sup>42</sup> Limited demographic and behavioural data are collected with the unlinked residual specimens following clinical tests. The surveys cover both those at higher risk of infection, such as homosexual men and heterosexuals attending GUM clinics and injecting drug users attending services, and a more general population sample through monitoring HIV prevalence in over 60% of all pregnant women. The survey of injecting drug users differs in that a voluntary saliva sample is provided with a self completed questionnaire detailing demographic, sexual, and drug injecting behaviour. This survey represents some of the most detailed sexual behaviour data collected within the existing surveillance systems.<sup>43</sup>

Data from the National Blood Service (NBS) provide prevalence information in a lower risk population group, as the criteria for donation excludes those at increased risk of blood borne infections, including men who have had sex with men, those who have ever injected drugs, and those who have had heterosexual contact with high risk partners<sup>44</sup> (table 1). Laboratory reports for confirmed acute hepatitis B are also routinely collected nationally.<sup>45–46</sup>

## BEHAVIOURAL SURVEYS

Table 2 illustrates existing ongoing behavioural surveys carried out by different academic and research groups in Britain. Two general population surveys of adults are currently carried out. The first, Natsal, a probability sample study has been carried out twice a decade apart,<sup>13–47</sup> remains the largest probability sample study of its kind in Britain. The 2000 survey

**Table 1** Data currently available from HIV and STI surveillance—ongoing surveillance

Name and custodian	Description	Geographical area	Population covered	Time period	Demographic	Behavioural	Biological	Reference
<b>Sexually transmitted infection surveillance</b>								
New episodes seen at genitourinary medicine clinics (KC60). CDSC	Statutory reporting of all episodes diagnosed at GUM clinics	National	All episodes diagnosed at GUM clinics	1917–	Age group, sex	Sexual orientation (selected diagnoses)	STI diagnosis	6
Enhanced Surveillance of sexually transmitted infections in England. CDSC	Individual based KC60 by clinic, statutory reporting	London	All individuals attending GUM clinics	2000–	Age, sex, ethnicity, residence	Sexual orientation, previous STI, coinfections, repeat infections	STI diagnoses	
Gonococcal resistance to antimicrobials surveillance programme (GRASP). CDSC	Active, sentinel surveillance system prompted by laboratory referrals of gonococcal isolates to determine the epidemiology of antimicrobial resistance in north. <i>N gonorrhoeae</i> in England and Wales. Sampling for 3 months of each year.	30 GUM clinics	Individuals with antibiotic resistant gonococcal infections	2000–3	Age, sex, ethnicity, residence	Sexual orientation, number of sexual partners, region of sex abroad, concurrent STI, previous gonorrhoea	Gonorrhoea, antibiotic resistance, site of infection	37
Routine laboratory treponemal reporting. CDSC	Laboratory surveillance, additional information completed by clinicians sending specimen. Currently under review.	6 reference laboratories	All cases of infectious syphilis referred to reference laboratory for confirmation	1996–	Age, sex, country of birth, ethnicity, source of specimen	Sexual orientation, country where infection acquired and partners infection, pregnancy	Final syphilis diagnosis	69
Enhanced surveillance for infectious syphilis in the London Region. CDSC.	An enhanced study to monitor the number of cases and associated risk factors for infectious syphilis in London. Established in response to clusters of syphilis in homosexual men.	London	All cases of infectious syphilis (primary, secondary, and early latent) diagnosed at GUM clinics	April 2001–	Sex, age, county of birth, ethnicity	Sexual orientation, relevant social networks, reason for attending, number of sexual partners, where infection likely acquired, commercial sex workers	Stage of infection, HIV status (if known)	36
<b>HIV infection surveillance</b>								
HIV laboratory reports. CDSC	Reporting system from laboratories	National	All newly diagnosed HIV infections	1985–	Sex, age, ethnicity	Likely route of infection and location of infection if acquired heterosexually. Previous negative tests.	HIV-1/2 infection	39
AIDS case reports. CDSC	Reporting system from clinicians	National	All newly diagnosed AIDS cases	1985–99	Sex, age, ethnicity, country of birth	Likely route of infection and location of infection if this is ongoing heterosexual spread. Previous negative tests	AIDS case diagnoses. Pre-AIDS ARV treatment	39
Clinician HIV reporting. CDSC	Reporting system from clinicians	National	All newly diagnosed HIV infections	2000–	Sex age, ethnicity, country of birth, date of entry to UK	Various, depending on likely route of infection., including year of first sex, previous HIV tests, GUM clinic attendance and pregnancy history.	AIDS case diagnoses. Pre-AIDS ARV treatment	39
HIV infection route follow up. CDSC	Investigation, to interview where necessary of all newly diagnosed infections with no identified risk factor for HIV, to establish likely route of infection, or confirm ongoing heterosexual transmission in UK.	National	Newly diagnosed HIV infections reported with no identified likely route of infection	1991–	Sex age, ethnicity, country of birth, date of entry to UK, marital status	Detailed sexual behaviour, including previous STI and HIV test behaviour	HIV diagnosis	40
Survey of prevalent HIV infections diagnosed (SOPHID). CDSC	Annual cross sectional survey of all HIV diagnosed individuals receiving care	National	Prevalent diagnosed HIV infections	1995–	Sex, age, ethnicity	Likely route of infection	CD4 count, level of antiretroviral therapy	41
Unlinked anonymous survey of dried blood spots. CDSC	Repeated cross sectional survey unlinking and testing residual infant blood collected for metabolic testing for maternal HIV antibody	National (6 regions)	Pregnant women giving birth	1992–	Age, ethnicity, country of birth, area of residence		Infant blood tested for maternal HIV antibody	42

Table 1 continued

Name and custodian	Description	Geographical area	Population covered	Time period	Demographic	Behavioural	Biological	Reference
Unlinked anonymous survey of GUM clinic attendees. CDSC	Repeated cross sectional survey unlinking and testing residual blood for HIV	Sentinel (15 GUM clinics)	GUM clinic attendees receiving syphilis testing	1990–	Sex age, country of birth	Sexual orientation, STI diagnoses at visit, last HIV negative test	Serum sample tested for HIV, STI diagnoses	42
Unlinked anonymous survey of injecting drug users. CDSC	Repeated voluntary anonymous cross sectional survey with self completed questionnaire and saliva sample	Sentinel	Injecting drug users contacting services	1990–	Sex, age	Sexual orientation number of sexual partners, condom use, drug injecting practices, previous HIV test	Saliva tested for HIV, hepatitis B and C	42
Blood (and tissue) donations. National Blood Service	Testing of all donations. Detailed information collected for all confirmed positives	National	Population selected to donate blood (and tissues)	1995– (HIV 1986– HCV 1991)	Sex, age, ethnicity, country of birth, region of residence	Possible exposures to infection and location and time. Details of high risk partners, if heterosexual. Previous negative tests	HIV, HBV, HCV and <i>T pallidum</i>	44
Antenatal screening. National Blood Service	Antenatal screening of pregnant women carried out by the National Blood Service	Selected areas	Pregnant women	HBV 2000– HIV 2001–	Age, ethnicity, region		HIV, HBV	44
Laboratory reports of acute hepatitis. CDSC	Laboratory reports of acute hepatitis B	National	Laboratory confirmed acute hepatitis	1985–	Sex, age	Sexual orientation	HBV	45, 46

also collected and tested urine samples for genital *Chlamydia trachomatis* using ligase chain reaction (LCR) techniques to provide the first national prevalence estimates.<sup>48</sup> The second, the Omnibus survey is a multipurpose survey of the adult population routinely carried out by the Office for National Statistics. A module on contraceptive use and general sexual health including condom use has been included annually since 1997<sup>49</sup> (table 2).

A national survey of young people is currently being carried out by the Teenage Pregnancy Unit, as part of an evaluation of the teenage pregnancy strategy (table 2). An individual based tracking survey will be repeated three times a year to collect information from young people aged 13–21 and parents of young people aged 10–17 over a 3 year period. It will collect information on knowledge, attitudes, and behaviours around sex and relationships.<sup>50</sup>

A number of annual surveys of homosexual men attending social venues,<sup>51–53</sup> GUM clinics,<sup>51</sup> and Gay Pride events<sup>54</sup> are currently carried out (table 2). These use a stable set of behavioural indicators that can be monitored repeatedly. The three surveys developed and used a common set of core behaviour questions that allow comparisons of the three populations of MSM. A number of other surveys of injecting drug users<sup>55–56</sup> and among ethnic minorities<sup>2, 4, 57–58</sup> have also been carried out but none have been sustained. There is clearly a need for more ongoing investment and support to continue projects once established.

## HOW DO WE USE BEHAVIOURAL DATA?

Behavioural surveillance data can be used in a number of ways. They can allow the monitoring of the risk behaviours underlying HIV and STI transmission over time. UNAIDS has recommended that behavioural data collection should be a central part of HIV and STI surveillance programmes.<sup>28–59</sup>

A range of indicators can be used to measure the effectiveness of both HIV and STI prevention interventions in England and Wales. These include the behavioural determinants of disease transmission (for example, condom use, reported sexual partnerships) as well as disease incidence and prevalence in England and Wales. These “prevention indicators” have been developed to monitor four key areas relevant to HIV transmission and disease prevention and include HIV prevalence, HIV incidence, risk behaviour, and healthcare utilisation.<sup>42</sup> The indicators for monitoring the success (or failure) of HIV prevention in men who have sex with men are illustrated in table 3. Similar indicators have been used elsewhere,<sup>25–26, 60</sup> although the use of behaviour change as a proxy marker for STI incidence has raised debate.<sup>61–62</sup> The disproportionate effect of some factors on the transmission dynamics of STI means that reported risk behaviour doesn't entirely correlate with transmission. The role of sexual networks in transmission is important and behavioural surveillance cannot always measure these. Prevention indicators have been evaluated in a number of settings, however, and found to be useful for measuring the success of prevention programmes, although multiple sources of data are necessary to provide context.<sup>63</sup> This in turn facilitates more effective HIV prevention and community planning. Prevention indicators may be developed using a variety of available data within ongoing surveillance systems. This allows the interpretation of HIV and STI trends within different population groups, and through the monitoring of risk behaviours, can indicate when outbreaks of infection may occur.<sup>64</sup>

A potential research priority highlighted in the new national strategy for sexual health and HIV was a need for better understanding of the sexual networks, health seeking behaviour, and risk behaviour of targeted groups.<sup>65</sup> The monitoring of behavioural indicators within different population groups would provide data on both health seeking behaviours

**Table 2** Behavioural surveillance data currently available from external academic and research groups,—ongoing surveillance

Name and custodian	Description	Geographical area	Population covered	Time period	Demographic	Behavioural	Biological	Reference
National Survey of Sexual Attitudes and lifestyles (I and II). Department of STD Royal Free and University College Medical School.	A survey of sexual attitudes and lifestyles in British population, using stratified probability sample of men and women aged 16–44. Interviews using CAPI and CASI	National	General population, 11161 surveyed	2000	Ethnic, socioeconomic, and demographic data	Sexual behaviour and attitudes, including partner formation, sexual mixing and STI acquisition	Urine sample tested for chlamydia	13
Omnibus Study, Office for National Statistics.	Multipurpose survey of population. Interviewing carried out each month; questions cover a variety of topics reflecting different users requirements. Random probability sample of 3000 private households selected monthly using postcode address file as sampling frame. Uses CAPI	National	General population, adults aged 16 and over	1997–	Age, ethnicity, residence	Contraception, condom use, sexual orientation, number of sexual partners in past year, knowledge of STIs		49
Evaluation of teenage pregnancy strategy. Tracking survey. Teenage pregnancy unit. London School of Hygiene and Tropical Medicine, University College London and BMRB Social Research.	Individual based tracking survey of knowledge attitudes and behaviour, using random location sampling. Fieldwork included 200 sampling panels in England using areas with higher density of 13–44 year olds. Interviews using CAPI, and self completion for sex questions	National	12150 young people (aged 13–21) and parents of young people (aged 10–17).	Oct 2000– March 2003	Age, sex, socioeconomic status	Knowledge attitudes and behaviour around sex and relationships and impact of awareness of teenage pregnancy strategy's media campaign		50
Gay Men's Sexual Health Survey. Department of Sexually Transmitted Diseases. Royal Free and University College Medical School.	Repeated cross sectional survey to estimate prevalence of high risk sexual behaviour among homo/bisexual men in London. Sites selected to be representative of GUM clinics and commercial venues. Original sampling frame defined using a register of all known primarily gay venues in London	Inner London, Brighton and Manchester in 2000	Homosexual men resident, socialising or using sexual health services in London	1996–	Age, ethnicity, residence, education and employment and health service use including perceived HIV status and HIV testing history.	Number of sexual partners, age of first anal intercourse, age of last sex partner, condom use and HIV status of UAI partners	Saliva sample, tested for HIV, since 2000	51
Gay Men's Sex Survey. Sigma Research.	Repeated cross sectional survey of homo/bisexual men. Self completed questionnaire. Questions vary by city, but set of core questions collected through the study period. Additional recruitment has been done through HIV health promotion agencies and free gay newspaper	National (7 cities)	Homo/bisexual men attending Gay Pride festivals and events	1993– (excluding 1996)	Age, ethnicity, education, residence, health service use including previous HIV tests, perceived HIV status and previous STIs	Sexual behaviour and attitudes including condom use, number of partners, serostatus of partners		54
The 4 Gym Study. Camden and Islington Community Health Services NHS Trust and The Royal Free Hospital School of Medicine	Repeated cross sectional questionnaire survey of MSM attending gyms, including peer education evaluation	Inner London	Homosexual men attending 5 gyms in inner London	1997–	Age, residence, ethnicity, education	Sexual orientation, drug use, last HIV test, number of sexual partners, HIV status of partners		52
Royal Free Hampstead NHS Trust Hospital	Repeated cross sectional questionnaire survey of all attending for HIV tests within a period of time. Investigates the sexual behaviours of those seeking HIV tests Comparison of behaviours of first testers with repeat testers.	One London HIV testing clinic	Population attending HIV testing clinic including heterosexuals and homosexuals	1995–6, 1998–9, 2002–3	Age, ethnicity, residence, education	Number of sexual partners, health care use, previous HIV tests, reason for tests	HIV test result	70



**Table 3** Prevention indicators for HIV and hepatitis transmission in homo/bisexual men

	Area	Subcategory	
<b>Prevalence markers</b>			
New diagnoses of HIV infections	UK	<25 >25 Total	
Prevalent diagnosed HIV infections receiving care	England	All	
First HIV tests at six sentinel laboratories	England	Total Proportion positive	
Prevalence of previously undiagnosed HIV infection in GUM clinic attenders†	London	<25	
	Elsewhere in England and Wales	<25	
<b>Incidence markers</b>			
Median age at diagnosis of HIV infection	UK	All	
Median CD4 counts at year of HIV infection diagnosis‡	England and Wales	<25 >25	
Laboratory reports of acute hepatitis B acquired through sex between men	England and Wales	All	
<b>Markers of risk</b>			
Homosexually acquired gonorrhoea	England and Wales	All	
Acute STI in HIV positive GUM clinic attenders	England and Wales	Known positive	Proportion with STI Number with STI Total
Percentage reporting unprotected anal intercourse in the past year	London	Any partners  Partners of unknown or serodiscordant HIV status	
<b>Markers of healthcare utilisation</b>			
Attending GUM clinic in the past year	London	Proportion Number	
Having an HIV test in the past year	London	Proportion Number	
HIV tests carried out at GUM clinics§	England and Wales	Number	

†Undiagnosed before the clinic attendance.

‡Mean CD4 count.

§HIV testing with counselling: new episodes seen at genitourinary medicine clinics.

and risk behaviours. Behavioural surveillance could also measure progress towards increased HIV testing of GUM clinic attendees through monitoring HIV testing patterns in different population groups.

Finally, behavioural surveillance data will enable us to identify priority areas for further in-depth epidemiological or socioanthropological research. Much of this research should be developed in collaboration with local academic and service partners in the most vulnerable areas or population groups.

### WHAT ARE OUR OPTIONS?

Behavioural surveillance programmes have now been implemented in the United States,<sup>26–66</sup> Switzerland,<sup>25</sup> Australia, and Hong Kong.<sup>67</sup> The United States has formed a HIV/STD Behavioural Surveillance Working Group to build and maintain a behavioural surveillance system for HIV and STI. They have achieved this through developing standardised measures of risk behaviours for comparability of data across systems and used these in monitoring a combination of general population, at-risk populations, and infected populations. Modules of questions have been provided at the national level for states to use as appropriate.<sup>66</sup> In addition, HIV prevention indicators have been developed, which have set out specific indicators suitable for monitoring at state and local level. Collection of data for these is coordinated at local level.

Canada has similarly combined national behaviour telephone surveys with more targeted behavioural surveys in homosexual men and injecting drug users (IDU) although they have not established nationally standardised modules of questions. Australia has used a combination of targeted behavioural surveys in MSM and IDU, from which key indicators are coordinated nationally with HIV surveillance and incidence data. They are currently moving towards national coordination of STI surveillance,<sup>68</sup> and the development of a

coordinated national approach to collection of behavioural risk factor data. The first national survey of sexual health and sexual behaviour and attitudes administered through telephone interview is currently being carried out. Hong Kong has established a behavioural surveillance system, carrying out an annual general population survey of sexual behaviour in men aged 18–60 using a combination of personal interview and a prerecorded telephone interview using a mobile phone.<sup>23</sup>

A combination of approaches could be used in England and Wales. A behavioural surveillance unit (BSU) within the HIV and STI Division has now been established at the Communicable Disease Surveillance Centre (CDSC). In association with key external partners the unit aims to collate data derived from ongoing local and national sexual behavioural surveillance and research programmes within CDSC and outside.

The BSU will streamline current behavioural data collection through existing surveillance systems. Collaborative partnerships with academic and research institutions involved in behavioural research will be established to define and collate key behavioural indicators relevant to HIV and other STI transmission. These indicators will include sexual behaviours such as number of sexual partners, types of sexual intercourse (vaginal, anal, and oral), and potentially preventative behaviours such as condom use and health service use for HIV and other STI screening. This would give an overview of behaviours at the population level in both the general population and in those with disease. A surveillance system, which will allow the prospective monitoring of the important risk indicators, could then be established.

A set of core questions will be established, which will draw on existing validated questions used in a variety of studies. This will enable improved comparability of data from diverse sources, at both national and local level. It will provide a comprehensive picture of sexual health, which can be monitored over time.

## Key points

- Surveillance data show large recent rises in STIs in the UK but lack details on the sexual behaviours and mixing patterns underlying these trends
- Behavioural surveillance has successfully monitored the effectiveness of prevention programmes internationally
- Key indicators will be produced from the wealth of existing disease and behavioural survey data available
- The impact of interventions and health promotion strategies on behaviour in England and Wales can be measured using these indicators

As a secondary, longer term objective, the BSU will work towards developing new behavioural surveillance systems for monitoring groups where there are currently inadequate data. Specially designed studies will be developed to complete the knowledge gaps—for example, in primary care and in ethnic minorities, where data cannot be obtained through enhancing existing systems. Again this is likely to be best achieved in partnership with external collaborators.

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## REFERENCES

- 1 **World Bank**. *World development report 1993. Investing in health. World development indicators*. New York: Oxford University Press, 1993.
- 2 **Hughes G**, Andrews N, Catchpole M, *et al*. Investigation of the increased incidence of gonorrhoea diagnosed in genitourinary medicine clinics in England, 1994–6. *Sex Transm Infect* 2000;**76**:18–24.
- 3 **Hughes G**, Brady A, Catchpole MA, *et al*. Characteristics of those who repeatedly acquire sexually transmitted infections: a retrospective cohort study of attendees at three urban sexually transmitted disease clinics in England. *Sex Transm Dis* 2001;**28**:379–86.
- 4 **Low N**, Sterne JAC, Barlow D. Inequalities in rates of gonorrhoea and chlamydia between black ethnic groups in south east London: cross sectional study. *Sex Transm Infect* 2001;**77**:15–20.
- 5 **Lacey C**, Merrick D, Bensley D, *et al*. Analysis of the sociodemography of gonorrhoea in Leeds, 1989–93. *BMJ* 1997;**314**:1715–18.
- 6 **PHLS**, DHSS and PS and the Scottish ISD(D)5 Collaborative Group. *Sexually transmitted infections in the UK: new episodes seen at genitourinary medicine clinics, 1996 to 2001*. London: Public Health Laboratory Service, 2001. ([www.phls.co.uk/topics\\_az/hiv\\_andsti/epidemiology/sti\\_data.htm](http://www.phls.co.uk/topics_az/hiv_andsti/epidemiology/sti_data.htm))
- 7 **CDSC**. *HIV and AIDS in the UK. An epidemiological review: 2000*. London: Public Health Laboratory Service, 2001.
- 8 **CDSC**. Increased transmission of syphilis in Manchester. *Commun Dis Rep CDR Wkly* 2000;**10**:89.
- 9 **CDSC**. Increased transmission of syphilis in men who have sex with men reported from Brighton and Hove. *Commun Dis Rep CDR Wkly* 2000;**10**:177–80.
- 10 **CDSC**. An outbreak of infectious syphilis in Bristol. *Commun Dis Rep CDR Wkly* 1997;**7**:291.
- 11 **CDSC**. Outbreak of heterosexually acquired syphilis in Cambridgeshire. *Commun Dis Rep CDR Weekly* 2000;**10**:401–4.
- 12 **Higgins SP**, Sukthankar A, Mahto M, *et al*. Syphilis increases in Manchester, UK. *Lancet* 2000;**355**:1466.
- 13 **Johnson AM**, Mercer CH, Erens B, *et al*. Sexual behaviour in Britain: partnerships, practices, and HIV risk behaviours. *Lancet* 2001;**358**:1835–42.
- 14 **Berglund T**, Fredlund H, Giesecke J. Epidemiology of the reemergence of gonorrhea in Sweden. *Sex Transm Dis* 2001;**28**:111–14.
- 15 **Dupin N**, Jdid R, N'Guyen YT, *et al*. Syphilis and gonorrhoea in Paris: the return. *AIDS* 2001;**15**:814–15.
- 16 **Chodyncka B**, Serwin A, Janczylo-Jankowska M, *et al*. Epidemiology of syphilis and gonorrhoea in eastern Poland in the years 1988–1997. *Int J STD AIDS* 1999;**10**:680–4.
- 17 **Hegyi V**, Danila T. Actual trends of the incidence of syphilis and gonorrhoea in the Slovak Republic in the years 1990–6. *Sex Transm Dis* 1998;**74**:376–7.
- 18 **CDC**. Increases in unsafe sex and rectal gonorrhea among men who have sex with men - San Francisco, California, 1994–1997. *MMWR* 1999;**48**:45–8.
- 19 **CDC**. Gonorrhea: United States, 1998. *MMWR* 2000;**49**:538–42.
- 20 **CDC**. Outbreak of syphilis among men who have sex with men: southern California, 2000. *MMWR* 2001;**50**:117–20.
- 21 **Kitsiripornchai S**, Markowitz LE, Ungchusak K, *et al*. Sexual behavior of young men in Thailand: regional differences and evidence of behavior change. *J Acquir Immune Defic Syndr Hum Retroviral* 1998;**18**:282–8.
- 22 **Gorbach PM**, Sophaeb H, Phalla T, *et al*. Sexual bridging by Cambodian men: potential importance for general population spread of STD and HIV epidemics. *Sex Transm Dis* 2000;**27**:320–6.
- 23 **Lau JT**, Wong WS. Behavioural surveillance of sexually-related behaviours for the cross-border traveller population in Hong Kong: the evaluation of the overall effectiveness of relevant prevention programmes by comparing the results of two surveillance surveys. *Int J STD AIDS* 2000;**11**:719–27.
- 24 **Asimwe-Okiror G**, Opio AA, Musinguzi J, *et al*. Change in sexual behaviour and decline in HIV infection among young pregnant women in urban Uganda. *AIDS* 1997;**11**:1757–63.
- 25 **Dubois-Arber F**, Jeanin A, Spencer B. Long term evaluation of a national AIDS prevention strategy: the case of Switzerland. *AIDS* 1999;**13**:2571–82.
- 26 **Rugg DL**, Heitgerd JL, Cotton DA, *et al*. CDC HIV prevention indicators: monitoring and evaluating HIV prevention in the USA. *AIDS* 2000;**14**:2003–13.
- 27 **Catchpole M**, Harris J, Renton A, *et al*. Surveillance of sexually transmitted infections: fit for purpose? *Int J STD AIDS* 1999;**10**:493–4.
- 28 **UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance**. *Guidelines for Second Generation HIV Surveillance*. World Health Organization and the Joint United Nations Programme on HIV/AIDS, 2000.
- 29 **Fenton KA**, Johnson AM, McManus S, *et al*. Measuring sexual behaviour: methodological challenges in survey research. *Sex Transm Infect* 2001;**75**:84–92.
- 30 **CDC**. Prevalence of risk behaviours for HIV infection among adults—United States, 1997. *MMWR Morb Mortal Wkly Rep* 2001;**50**:262–5.
- 31 **Saunders P**, Mathers J, Parry J, *et al*. Identifying 'non-medical' datasets to monitor community health and well-being. *J Public Health Med* 2001;**23**:103–8.
- 32 **Simms I**, Nicoll A. *Sexual health in England: a guide to national and local surveillance and monitoring data*. London: Health Education Authority, 2000.
- 33 **Ross RW**, Tikkanen R, Mansson SA. Internet samples and conventional samples of men who have sex with men: implications for research and HIV interventions. *Soc Sci Med* 2000;**51**:749–58.
- 34 **Elford J**, Bolding G, Sherr L. Seeking sex on the Internet and sexual risk behaviour among gay men using London gyms. *AIDS* 2001;**15**:1409–15.
- 35 **Nardone A**, Frankis JS, Dodds JP, *et al*. A comparison of high-risk sexual behaviour and HIV testing amongst a bar-going sample of homosexual men in London and Edinburgh. *Eur J Public Health* 2001;**11**:185–9.
- 36 **CDSC**. Preliminary results of enhanced surveillance of infectious syphilis in London. *Commun Dis Rep CDR Wkly* [serial online] 2002 [cited 31 January 2002];12(5): available from [www.phls.co.uk/publications/cdr/PDFfiles/2002/cdr0502.pdf](http://www.phls.co.uk/publications/cdr/PDFfiles/2002/cdr0502.pdf).
- 37 **GRASP Steering Group**. *The gonococcal resistance to antimicrobials surveillance programme (GRASP) year 2000 report*. London: Public Health Laboratory Service, 2001.
- 38 **Hughes G**, Catchpole M, Fenton K, *et al*. Comparison of risk factors for four sexually transmitted infections: results from a study of attendees at three genitourinary medicine clinics in England. *Sex Transm Infect* 2000;**76**:262–7.
- 39 **CDSC**. HIV and AIDS in the United Kingdom: monthly report - October 2001. *Commun Dis Rep CDR Wkly* [serial online] 2001 [cited 29 November 2001];11(48): available from: [www.phls.co.uk/publications/cdr/PDFfiles/2001/cdr4801.pdf](http://www.phls.co.uk/publications/cdr/PDFfiles/2001/cdr4801.pdf).
- 40 **Gilbart VL**, Evans BG, Noone A, *et al*. Second generation heterosexual transmission of HIV-1 infection. *CDR* 1992;**2**:R55–9.
- 41 **Molesworth AM**. Results of a survey of diagnosed HIV infections prevalent in 1996 in England and Wales. *Commun Dis Pub Health* 1998;**1**:271–5.
- 42 **Unlinked Anonymous HIV Surveys Steering Group**. *Prevalence of HIV and hepatitis infections in the United Kingdom 2000*. London: Department of Health, 2001.
- 43 **Noone A**, Durante AJ, Brady AR, *et al*. HIV infection in injecting drug users attending centres in England and Wales, 1990–1991. *AIDS* 1993;**7**:1501–7.
- 44 **CDSC**. Surveillance of viral infections in donated blood: England and Wales, 2000. *Commun Dis Rep CDR Wkly* [serial online] 2001 [cited 25 October 2001];11(43): available from: [www.phls.co.uk/publications/cdr/PDFfiles/2001/cdr4301.pdf](http://www.phls.co.uk/publications/cdr/PDFfiles/2001/cdr4301.pdf).
- 45 **Balogun MA**, Ramsay ME, Fairley CK, *et al*. Acute hepatitis B infection in England and Wales: 1985–96. *Epidemiol Infect* 1999;**122**:125–31.
- 46 **Ramsay ME**, Balogun MA, Collins M, *et al*. Laboratory surveillance of hepatitis C virus infection in England and Wales: 1992 to 1996. *Commun Dis Pub Health* 1998;**1**:89–94.
- 47 **Johnson A**, Wadsworth J, Wellings K, *et al*. *Sexual attitudes and lifestyles*. Oxford: Blackwell Scientific Publications, 1994.
- 48 **Fenton KA**, Korovessis C, Johnson AM, *et al*. Sexual behaviour in Britain: reported sexually transmitted infections and prevalent genital Chlamydia trachomatis infection. *Lancet* 2001;**358**:1851–4.
- 49 **Dawe F**, Meltzer H. *Contraception and sexual health, 2000*. London: Office for National Statistics, 2002.

- 50 **BMRB International.** *Evaluation of the teenage pregnancy strategy. Tracking survey. Report of results of benchmark wave.* LSHTM, UCL, BMRB International, 2001.
- 51 **Dodds J, Nardone A, Mercey D, et al.** Increase in high risk sexual behaviour among homosexual men, London 1996–8: cross sectional, questionnaire study. *BMJ* 2000;**320**:1510–11.
- 52 **Elford J, Bolding G, Maguire M, et al.** Gay men, risk and relationships. *AIDS* 2001;**15**:1053–5.
- 53 **Hart GJ, Flowers P, Der GJ, et al.** Homosexual men's HIV related sexual risk behaviour in Scotland. *Sex Transm Infect* 1999;**75**:242–6.
- 54 **Hickson F, Reid D, Weatherburn P, et al.** *Time for more. Findings from the National Gay Men's Sex Survey 2000.* London: Sigma Research, 2001.
- 55 **Stimson GV, Hunter GM, Donoghoe MC, et al.** HIV-1 prevalence in community-wide samples of injecting drug users in London, 1990–1993. *AIDS* 1996;**10**:657–66.
- 56 **Hunter GM, Donoghoe MC, Stimson GV, et al.** Changes in the injecting risk behaviour of injecting drug users in London, 1990–1993. *AIDS* 1995;**9**:493–501.
- 57 **Evans BA, Bond RA, Macrae KD.** Racial origin, sexual behaviour, and genital infection among heterosexual men attending a genitourinary medicine clinic in London (1993–4). *Sex Transm Infect* 1998;**74**:40–4.
- 58 **Fenton KA, Chinouya M, Davidson O, et al.** HIV transmission risk among sub-Saharan Africans in London travelling to their countries of origin. *AIDS* 2001;**15**:1442–5.
- 59 **UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance.** *Guidelines for sexually transmitted infections surveillance.* Geneva: World Health Organization and the Joint United Nations Programme on HIV/AIDS, 1999.
- 60 **Mertens T, Caraël M, Sato P, et al.** Prevention indicators for evaluating the progress of national AIDS programmes. *AIDS* 1994;**8**:1359–69.
- 61 **Peterman TA, Lin LS, Newman DR, et al.** Does measured behavior reflect STD risk? An analysis of data from a randomised controlled behavioral intervention study. Project RESPECT Study Group. *Sex Transm Dis* 2000;**27**:446–51.
- 62 **Fishbein M, Jarvis B.** Failure to find a surrogate for STD incidence—what does it really mean? *Sex Transm Dis* 2000;**27**:452–5.
- 63 **Page-Shafer K, Kim A, Norton P, et al.** Evaluating national HIV prevention indicators: a case study in San Francisco. *AIDS* 2000;**14**:2015–26.
- 64 **Aral SK, Berman SM, Aral SO.** Anticipating Outbreaks: A prevention role for integrated information systems. *Sex Transm Dis* 2002;**29**:6–12.
- 65 **Department of Health.** *The national strategy for sexual health and HIV.* London: DoH, 2001.
- 66 **Reitmeijer CA, Lansky A, Anderson JE, et al.** Developing standards in behavioral surveillance for HIV/STD prevention. *AIDS Educ Prev* 2001;**13**:268–78.
- 67 **Lau JTF, Siah PC.** Behavioural surveillance of sexually-related risk behaviours of the Chinese male general population in Hong Kong: a benchmark study. *AIDS Care* 2001;**13**:221–32.
- 68 **Dore GJ, Kaldor JM.** Sexually transmitted diseases surveillance in Australia: towards a coordinated national system. *Commun Dis Intell* 1998;**22**:49–52.
- 69 **CDSC.** Sexually transmitted diseases quarterly report: syphilis in the United Kingdom. *Commun Dis Rep CDR Wkly* [serial online] 2001 [cited 29 November 2001];11(48): available from [www.phls.co.uk/publications/cdr/PDFfiles/2001/cdr4801.pdf](http://www.phls.co.uk/publications/cdr/PDFfiles/2001/cdr4801.pdf).
- 70 **Leaity S, Sherr L, Wells H, et al.** Repeat HIV testing: high-risk behaviour or risk reduction strategy? *AIDS* 2000;**14**:547–52.

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